

Name: _____

at1124exam: Radicals and Squares (v829)

Question 1

Simplify the radical expressions.

$$\sqrt{20}$$

$$\sqrt{50}$$

$$\sqrt{12}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 5}}{2\sqrt{5}}$$

$$\frac{\sqrt{5 \cdot 5 \cdot 2}}{5\sqrt{2}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 3}}{2\sqrt{3}}$$

Question 2

Find all solutions to the equation below:

$$\frac{(x+6)^2}{2} - 4 = 4$$

First, add 4 to both sides.

$$\frac{(x+6)^2}{2} = 8$$

Then, multiply both sides by 2.

$$(x+6)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x+6 = \pm 4$$

Subtract 6 from both sides.

$$x = -6 \pm 4$$

So the two solutions are $x = -2$ and $x = -10$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 6x = 27$$

$$x^2 + 6x + 9 = 27 + 9$$

$$x^2 + 6x + 9 = 36$$

$$(x + 3)^2 = 36$$

$$x + 3 = \pm 6$$

$$x = -3 \pm 6$$

$$x = 3 \quad \text{or} \quad x = -9$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 2x^2 + 12x + 10$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 6x) + 10$$

We want a perfect square. Halve 6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 6x + 9 - 9) + 10$$

Factor the perfect-square trinomial.

$$y = 2((x + 3)^2 - 9) + 10$$

Distribute the 2.

$$y = 2(x + 3)^2 - 18 + 10$$

Combine the constants to get **vertex form**:

$$y = 2(x + 3)^2 - 8$$

The vertex is at point $(-3, -8)$.